Claims

1. An exhaust gas treatment unit for the selective catalytic reduction of nitrogen oxides under lean exhaust gas conditions comprising at least one catalyst with a catalytically active component for selective catalytic reduction and at least one storage component for nitrogen oxides.

2. The exhaust gas treatment unit according to Claim 1, wherein said catalytically active component is a solid acid system of titanium dioxide and vanadium.

3. The exhaust gas treatment unit according to Claim 2, further comprising that the solid acid system also contains at least one component selected from the group consisting of tungsten oxide, molybdenum oxide, silicon dioxide, sulfate and zeolites, wherein the zeolites can be present in the acid H form or can be exchanged with metal ions.

4. The exhaust gas treatment unit according to Claim 1, wherein said catalytically active component contains at least one zeolite, wherein the zeolite can be present in the acid H form or can be exchanged with metal ions.

5. The exhaust gas treatment unit according to Claim 1, wherein the nitrogen oxides storage component contains at least one compound of an element selected from the group consisting of an alkali metal, an alkaline earth metal and cerium.

6. The exhaust gas treatment unit according to Claim 2, wherein the nitrogen oxides storage component contains at least one compound of an element selected from the group consisting of an alkali metal, an alkaline earth metal and cerium.

7. The exhaust gas treatment unit according to Claim 3, wherein the nitrogen oxides storage component contains at least one compound of an element selected from the group consisting of an alkali metal, an alkaline earth metal and cerium.

8. The exhaust gas treatment unit according to Claim 4, wherein the nitrogen oxides storage component contains at least one compound of an element selected from the group consisting of an alkali metal, an alkaline earth metal and cerium.

9. The exhaust gas treatment unit according to Claim 5, wherein the nitrogen oxides storage component is catalyzed with at least one member of the platinum group metals selected from the group consisting of platinum, palladium, rhodium and iridium.

10. The exhaust gas treatment unit according to Claim 5, wherein the catalyst also contains a catalytically active component based on a support oxide selected from the group consisting of aluminum oxide, silicon dioxide, cerium oxide, zirconium oxide, titanium oxide and mixed oxides thereof catalyzed with at least one of the platinum group metals selected from the group consisting of platinum, palladium, rhodium and iridium.

11. The exhaust gas treatment unit according to Claim 1, wherein the catalyst is present in the form of a honeycomb structure specified as a full extrudate.

12. The exhaust gas treatment unit according to Claim 1, wherein said catalytically active component is present in the form of a honeycomb structure specified as a full extrudate, onto which are applied the nitrogen oxide storage components in the form of a coating.

13. The exhaust gas treatment unit according to Claim 1, wherein said catalytically active component and the nitrogen oxide storage component are present in the form of a coating on an inert carrier structure in the form of a honeycomb monolith.

14. The exhaust gas treatment unit according to Claim 13, wherein said catalytically active component and the nitrogen oxide storage component are present in two separate layers on the inert carrier structure.

15. The exhaust gas treatment unit according to Claim 11, the layer with the nitrogen oxide storage component is applied directly to the support structure and the layer with the catalytically active component is on top of the layer with the nitrogen oxide storage component and is in direct contact with the exhaust gas.

16. The exhaust gas treatment unit according to Claim 1, further comprising an oxidation catalyst located in the exhaust gas treatment unit, upstream of the catalyst for selective catalytic reduction.

17. The exhaust gas treatment unit according to Claim 16, further comprising a hydrolysis catalyst located in the exhaust gas treatment unit, between the oxidation catalyst and the catalyst for selective catalytic reduction.

18. The exhaust gas treatment unit according to Claim 14, further comprising an ammonia barrier catalyst is located in the exhaust gas treatment unit, downstream of the catalyst for selective catalytic reduction.

19. A process for removing nitrogen oxides from lean exhaust gas from an internal combustion engine by selective catalytic reduction using ammonia, comprising passing the exhaust gas over a catalyst which contains a catalytically active component for selective catalytic reduction (SCR component) and a storage component for nitrogen oxides (NOx component), with at least the occasional supply of ammonia, wherein the NOx storage component absorbs the nitrogen oxides from the exhaust gas during operational phases of the engine with exhaust gas temperatures below the light-off temperature for the component for selective catalytic reduction and the nitrogen oxides are desorbed at exhaust gas temperatures above the light-off temperature for selective catalytic reduction by supplying ammonia and react with ammonia, together with the nitrogen oxides present in the exhaust gas, on the SCR component to give nitrogen and water.

20. The process according to Claim 19, wherein the NOx storage component is catalyzed with at least one of the platinum group metals selected from the group consisting of platinum, palladium, rhodium and iridium.

21. The process according to Claim 19, wherein an oxidation catalyst is located in the exhaust gas treatment unit upstream of the catalyst for selective catalytic reduction and the ammonia is supplied to the exhaust gas between the oxidation catalyst and the catalyst for selective catalytic reduction.

22. The process according to Claim 20, wherein an oxidation catalyst is located in the exhaust gas treatment unit upstream of the catalyst for selective catalytic reduction and the ammonia is supplied to the exhaust gas between the oxidation catalyst and the catalyst for selective catalytic reduction.

23. A process according to Claim 19, wherein an ammonia barrier catalyst is located in the exhaust gas treatment unit downstream of the catalyst for selective catalytic reduction.

24. The process according to Claim 19, wherein a hydrolysis catalyst is located in the exhaust gas treatment unit between the oxidation catalyst and the catalyst for selective catalytic reduction and a precursor compound to be converted into ammonia by hydrolysis is supplied to the hydrolysis catalyst in order to form ammonia.

25. The process according to Claim 20, wherein an ammonia barrier catalyst is located in the exhaust gas treatment unit downstream of the catalyst for selective catalytic reduction.

26. The process according to Claim 19, wherein the internal combustion engine is a diesel engine.

27. A process according to Claim 19, wherein the internal combustion engine is a lean operated gasoline engine which is operated with rich air/fuel mixtures during acceleration phases.

28. A process according to Claim 27, wherein the ammonia required for selective catalytic reduction is produced on a suitable catalyst from the appropriate constituents in the rich exhaust gas during the acceleration phases of the engine.